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Observations on the Employment of Artificial Insemination as Applied to British Livestock Breeding*

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I have chosen a subject which is being forced upon our attention more and more as time goes on, and which has not recently been adequately aired at Divisional meetings of the N.V.M.A. It is a subject of which, in view of the interest that has been aroused by various breed societies, we may be compelled to take more notice in future, and I think it is time that there should be an exchange of opinion regarding its possible applicability and suitability for incorporation into livestock breeding practice in this country. I hope later to explain more fully just exactly what I mean by this.

It would be well to review, very rapidly, some of the progressive steps which have led to the most modern developments of controlled artificial insemination, as they are regularly practised in some overseas countries to-day. Before so doing, however, it is useful to recapitulate the principal reasons which have brought about the employment of this technique, as an aid in the breeding of domesticated livestock. As I see them, these reasons fall naturally into three categories: (i) for physiological purposes; (ii) to correct pathological abnormality; (iii) for economic or politico-economic reasons. If these are expanded in some detail, they could be classified thus:—

(i) *Physiological.*—(*a*) To make reproduction possible in cases of infertility due to discrepancies in size between male and female, to abnormal physiological functioning, to sex antagonisms, or to other abnormal psychological phenomena.

(*b*) To attempt the breeding of interspecific hybrids, where the difference in species would not freely permit of natural mating, *e.g.*, the method has been used to cross the wild argali of Asia with domesticated sheep, the zebra with domesticated mares, gayals with domesticated (Ukrainian) cattle, and it has indications for its use in such crosses as the eland × cattle or the buffalo × cattle cross, which may ultimately have economic uses in tropical or sub-tropical countries.

(*c*) To make breeding in captivity possible, *e.g.*, silver foxes, etc.

(ii) *Pathological.*—To avoid infection of valuable males with diseases contracted during coitus, *e.g.*, dourine, and their spread subsequently to healthy females. To restrict the spread of infection among females where the male merely acts as an intermediate agent without necessarily becoming infected himself, *e.g.*, vaginitis, venereal granulomata, possibly contagious abortion, etc.

(iii) *Politico-Economic.*—This has given by far the greatest stimulus to the development of artificial insemination among animals. By its employment the energies of valuable males of proved superior merit are conserved, a far larger number of offspring can be obtained from a single superior male than would be possible from normal matings, and the rate of breed improvement of livestock can be speeded up wherever there exists a superabundance of breedable females but a scarcity of well-bred sires (*e.g.*, Russia, Argentina, etc.).

The technique of artificial insemination would also have great usefulness if it were desired to populate (or perhaps to repopulate) large areas of country with cattle, sheep or horses, in the shortest time possible. For example, it is being employed in parts of Kenya to lay the foundations of a new industry of Merino sheep-breeding.

Doubtless there are other similar applications which a moment's thought will call to mind.

BRIEF REVIEW OF HISTORY

Artificial insemination is regarded as having first been successfully carried out by Spallanzani in 1785, though possibly it was used in a limited sense earlier. It does not appear to have been put to much practical application for many years, although Hunter (*cit.* Home) in 1799, and Sims (1866) both apparently employed it to attempt to overcome sterility in the human female. In 1897 and 1898 Heape recommended

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its use to overcome sterility in mares due to inflammatory conditions of the cervix, abnormal vaginal secretions, stricture or stenosis of the os, and post-coital extrusion of semen. From then onwards it has been employed by veterinarians and others in a more or less mechanical fashion, with some degree of success.

The work of Ivanov in Russia, from 1899 onwards until the early post-war years probably did more than anything else to lay the sound foundations for the developments which have been seen during the last ten or twelve years. He first showed that conception would follow the introduction into the vagina of sperm suspended in an artificial medium and freed from the secretions of the secondary sexual glands, and that normal, healthy young would be born from such introductions.

Walton (1933), in his introductory chapter to the Bulletin published by the Imperial Bureau of Genetics, quotes the following results obtained by Ivanov:—

Year.	No. of Stallions.	No. of Mares Inseminated.	Percentage Foaling.
1909	3	57	40
1910	8	288	40·3
1911	31	2,285	35·5
1912	41	3,397	41·4
1913	17	777	42·3

It will be noted that the average number of mares inseminated from a single stallion was 19 in 1909, 36 in 1910, 73 in 1911, 82·8 in 1912, and 45·7 in 1913. The outbreak of the War in 1914 and the consequent interruption of Ivanov's work is responsible for the absence of results for later years, and possibly for the low figures of 1913. It is interesting to note these figures and compare them with results obtained in recent years at the big Russian breeding stations.

In 1919 the Soviet Government, faced with a serious depopulation of its flocks and herds, and with a very serious degeneration in the quality of what stock was left, owing to the absence of controlled selective breeding, founded the Moscow Central Experimental Breeding Station with Ivanov as its Director. Active work began in 1923, when 1,500 mares were inseminated, and by 1928 some 70,000 mares were so treated. At first, selected stallions only served selected healthy stud mares at the station; visiting mares, many of which were suffering from dourine, were inseminated by collecting ejaculate from the healthy mares. Spread of infection was thus to a large extent prevented.

During the years 1920 to 1930 much laboratory work in Russia, Japan, Great Britain and America was carried out by numerous workers, on the life of the sperm, optimum conditions for survival, rate of loss of fertilising power under different conditions of temperature, and the influence of various other environmental agencies. During this time great strides both in detailed knowledge of the sperm and in the practical application of artificial insemination were made. Walton (1926) was able to show that rabbit sperm posted from Cambridge to Edinburgh could be used with complete success to induce pregnancy and normal birth of offspring. The Russians were also making great progress in practical application and although Professor Ivanov's publications cease with an article published in 1930 in the *Veterinary Record* for January, others—too numerous to mention, many of whom undoubtedly owe much to his training, experience and encouragement—have continued the work he so ably began. It is unpleasant to have to point out that most Russian authors who have published results of work on artificial insemination fail to make any reference to the great work done by their pioneer countryman, and so far as the present author is aware none makes any direct acknowledgment of the indebtedness he owes to Ivanov's scientific ability and foresight. To those among us who knew Professor Ivanov, admired him for his great personal charm and respected him for his scientific attainments, this failure on the part of his successors is a very distressing feature.

I intend to refer later to some of the more up-to-date results claimed for the employment of modern methods, but it is interesting to review progress made from a more purely physiological aspect.

Lest some may not be aware of the progress which has been made in this country, particularly by the workers at the School of Agriculture, Cambridge, and by others abroad, I would like to draw your attention to the steps which have been taken to overcome difficulties in securing sperm from the male animal in such fashion that it can be used to best advantage, and to other steps which have led to the subordination of the female from playing an active part in coitus to becoming merely a passive recipient.

Techniques Available for Sperm Collection

There is a choice of several methods of collecting sperm for animal insemination. Some have distinct disadvantages: these will be briefly outlined here.

(*a*) *Collection from a Normal Service.*—This is the original method and it has been in common usage for some considerable time past. The female in oestrus is served in the normal way, and immediately afterwards semen is collected from the anterior vaginal floor by an inseminator, which is then inserted through the

cervix into the uterine cavity, where its contents are expelled. An alternative method is to insert a sponge into the vagina before service, remove it and squeeze the seminal fluid into a container, which is used to fill the inseminator subsequently. Collection from a normal service has certain disadvantages: the possibilities of infection being transferred from male to female or *vice versa* are not avoided; oestrus is essential in the female; and it is generally only possible to inseminate a small number of females from each service, so that male energies are not greatly conserved. The sponge method of collection has the further disadvantage that numbers of sperms are injured or destroyed by squeezing, while many others become entangled in the interstices of the sponge and cannot be removed.

On the other hand, there is greater guarantee of pedigree, less chance of unscrupulous malpractice, simplicity of technique, and less risk with a valuable, highly strung sire or dam of any untoward psychological sequelae.

(*b*) *Collection by Means of the Artificial Vagina.*—There are two main types of these; the Russian type, which is virtually a pure latex rubber lining for the vagina of the female; and the Cambridge pattern, which consists of a felt-covered metal or bakelite rigid tube, into which fits a latex rubber liner. The cavity between tube and liner is filled with warm soapy water and air, and at one end is a glass collecting chamber. Lubrication is effected by a small amount of pure white vaseline or liquid paraffin. The penis of the male is diverted just before penetration into the artificial vagina held alongside the female, and the sperm is collected in the glass container. There are now several modifications of this form, but the essential principles are the same in all.

In the Russian type, the sire serves into the rubber vaginal lining fitted to the female; this receives the ejaculation and is subsequently removed. There are now several different types of these all-rubber vaginae, but in each the principle is similar.

From either type subsequent procedure is similar. The semen is obtained pure and uncontaminated by vaginal secretions or saprophytic or pathogenic vaginal organisms, and it can be diluted suitably and used for the insemination of such other females as are in oestrus, or it may be used undiluted after division into appropriate fractions.

The disadvantages are that a female in oestrus is necessary, or alternatively a specially trained female which will allow the male to mount even though she is not in season. The technique is not so simple and, for the larger animals, two operators are usually required, while the apparatus must be maintained scrupulously clean, sterile, etc. Advantages are that coital infections are avoided; the complete uncontaminated emission is available and under complete control. A very useful detailed account of the use of both types of artificial vaginae, with notes on the preparation and care of the apparatus, was written in 1936 by Walton. This will well repay study by those interested.

(*c*) *Collection by Service-Crate.*—The purpose of this method is to secure the female in such a way that, irrespective of whether she is in oestrus or not, she cannot escape from the attentions of the male, which will mount and serve either into a Russian- or Cambridge-pattern vagina as above. Up to the present, the method is chiefly employed for sheep and cattle, since the females of these species are more tolerant and philosophical. Mares will probably never freely lend their co-operation to man for purposes of collection by service-crate, although individual mares can be trained to act as passive collaborators for this method.

(*d*) *Collection by Phantom Female.*—Certain sires, especially buck rabbits, rams and bulls, if a stuffed imitation of a female is presented to them, in which the skin is used and the general outline is preserved, will mount and serve into an artificial vagina held in a suitable position. Such phantom females are useful in that not only is no female in season required but no actual female is needed and no actual contact between the two parents takes place. Subsequent procedures are the same as those already mentioned above.

(*e*) *Collection by Electrical Stimulus.*—A technique has been elaborated by Gunn (1936) in Australia within the last few years and also used by Walton at Cambridge, whereby by passing an electrical stimulus through the lumbar region of the spinal cord, a normal emission of semen can be obtained in rams. This itself is remarkable, but when it is mentioned that previous administration of certain drugs (mainly acetylcholine, pilocarpine, and various pituitary preparations) to the ram will increase the ease and rapidity of ejaculation, the survivability of the sperms and the amount of the ejaculate, it will be realised what potentialities there are in the method. Administration of acetylcholine previously was followed by a sperm longevity of about 40 days *in vitro*, while certain pituitary extract injections increased this to about 65 days.

It will be readily realised that if further work shows that the fertilising power of the motile sperm is adequately retained for this long period, the extension of this technique in future years may lead to developments of profound significance for a country like Britain. So far as I am aware, this method of collection has not yet been attempted successfully in the larger domesticated animals, but there seems no

reason why it should not be applied to bulls provided safe and suitable methods of restraint are employed. It has possibilities in connection with the examination and investigation of breeding sires which are not functionally up to normal breeding standards as regards sperm count, density, total volume, reaction, etc., or are possibly infected with some such organisms as *Brucella abortus*, or tuberculosis of the genital organs, etc.

(*f*) *Collection by Frictional Methods.*—The more usual method of effecting this hardly merits more than mere mention, but since it is sometimes practised by certain dog breeders and owners of silver fox farms, especially abroad, perhaps it should be included. Manual or other friction is carried out until an emission is obtained; this is collected in a test tube and used to inseminate such females as are in oestrus. The method, though apparently eminently practical, and of use to prevent injuries to valuable breeding animals through fighting or playfulness, is a somewhat rough and ready one and does not commend itself to modern ideas.

I must refer, however, to a recent method of sperm collection developed in the U.S.A. by Miller and Evans, which I feel might well be made use of by the practitioner who wishes to collect sperm from a bull for examination or otherwise. This consists of gentle stroking massage with the fingers *per rectum* of the seminal vesicles first, which is followed by escape of the watery secretion of this organ, which may be collected in a test tube held in position under the prepuce. After this has begun to flow similar gentle massage is given to the vasa deferentia at their entrance into the urethra. Discharge of thick, white, milky fluid follows and this contains the spermatozoa in an almost pure, undiluted state. No erection occurs.

Collection and Storage of Sperm

Among other information accumulated during post-War years is the very pronounced fact that if spermatozoa are allowed to remain fully active by maintaining the temperature at or near blood heat, they rapidly lose their motility and die, whereas by lowering the temperature to 10° C. for the rabbit and to about 2° C. for the ram, they survive far longer, conserve their energy, and on warming later full motility is restored. Further, when semen is ejaculated it contains a supply of O_2 and CO_2; if exposed to air the tension and balance of these gases is disturbed. Semi-anaerobic conditions are optimum and these are best achieved by collecting sperm under a layer of liquid paraffin, which seals them off from contact with the air and prevents changes of O_2 and CO_2 tension in the semen.

Secretions of the accessory sexual glands are partly responsible for activating sperm movement, and therefore contact with these secretions reduces the time of survival. If recently collected ejaculate is sealed with liquid paraffin, centrifuged to separate the spermatozoa from the seminal fluids, and stored separately, Walton has shown that the time of survival is greatly increased. The time of survival of sperms shows an indirect ratio to the amount of energy dissipated by motility: sperms kept as inactive as possible, therefore, survive for the longest period of time.

Dilution of Sperm

The Cambridge School use the following solutions as dilutors for sperm, so that one emission may be made to serve for inseminating a number of females (up to about 10 to 18 in the case of cattle, for instance). The following is given by Hammond (1936), quoting Walton's work at Cambridge:—

	Sheep. grms.	Cattle. grms.	Horses. grms.
Solution 1—			
Anhydrous glucose ...	64	57	57·6
Distilled water	1000	1000	—
Solution 2—			
Crystalline sodium acid phosphate	41·6	34·1	—
Potassium acid phosphate...	1·7	1·4	—
Calcium acid phosphate	0·1	0·1	—
Magnesium acid phosphate...	0·1	0·1	—
Sodium sulphate ...	—	1·7	3·4
Peptone (salt free) water	1000	1000	1000

Solution I is made up just before use: Solution II is made up, sterilised and sealed in glass tubes previously. The two solutions are mixed immediately before use.

I would also like to add here two tables of comparisons given by Hammond, which are very useful for reference purposes.

Species.	Average amount of Ejaculate	Proportion of Accessory Gland Fluids.	Density of Sperm in Millions per c.c.	Duration of Fertility of Sperm Outside Body.
	c.c.			
Ram ...	1	Little	2,500	5 days
Bull ...	4·5	Moderate	1,000	3 „
Stallion	80·0	Plenty	200	½ day
Boar ...	120·0	A lot	300	Unknown

In Diluting the Ejaculate to Inseminate Females.

Species.	No. of c.c. of Semen to c.c. of Dilutor.	Amount used to Inseminate One Female.	No. of possible Inseminations per Ejaculate.
		c.c.	
Ram ...	1 : 3	0·1	40
Bull ...	1 : 1	0·5	18
Stallion	1 : 0	15·0	5
Boar ...	1 : 0	60·0	2

It may be interesting to some of you to record some of the results which have been reported, especially from Russia.

In 1928 the average number of ewes served from one ejaculation was 3·6 and the highest number fertilised by one ram was 220. In 1930 these figures were 5·6 and 670, while a total of 96,000 ewes were subjected to artificial insemination by one sheep-breeding organisation (the Ovtzevod) alone. Beller (1935) reports that eight to ten mares are regularly served from one ejaculation of a stallion at each of five different artificial insemination centres in Turkey, and the percentage of fertile services is between 70 and 80. Andreev (1937) treated 17,000 cows by inseminating each twice during each oestrus period and found that only 10 per cent. of them came into season a second time. (He suggests that the second insemination should take place about 25 hours after the first if best results are to be obtained.) Similarly, Kirillow (1937) found that only about 50 per cent. of cows conceived after a single insemination, while after a second insemination 60 per cent., and after a third about 89 per cent. conceived. He suggests second service 18 to 24 hours after the first. At the present time enormous numbers of animals in Continental countries, the Argentine, Africa, Australia and America are inseminated with at least as high a percentage of successful results as follows natural mating.

The questions probably naturally arise: "Why has not a similar development been seen in Great Britain? Is it likely that such a development will occur, and, if so, how can it be organised?" I propose to put before you some thoughts of my own, and offer some observations on these two points.

Application to British Stock Breeding

As I see the position, stock owners in this country are in a particularly fortunate position when compared with what pertains in many countries abroad. Here we have no great dearth of good average commercial sires, whether among horses, cattle, sheep or pigs. Our breeding units are small, we have a good working system established whereby stallions of both light and heavy breeds travel different districts, we have bull societies, Government-aided schemes for assistance in selecting and securing services from approved sires, and moreover we, as a race, have a higher development of individual ability amongst stock owners than is seen in many countries abroad.

Contrast these conditions with the more typically extensive (rather than intensive) conditions which exist, say, in a country like the Argentine or Russia. No serious problem has to be faced in collecting large numbers of females at one centre; there is no robust individualism or competitive spirit among those who own animals. Following political upheavals, periods of depression, etc., control of breeds and breeding was lost. Stocks degenerated into a type of scrub-cattle of poor quality. The importation of valuable sires from abroad would have been too costly to have been possible unless a far greater number of progeny per head could be obtained than was possible by natural means. This, then, I think, forced Russia, in particular, to pay the greatest attention to the furtherance of the work already begun by Ivanov, and provided the stimulus which has brought the technique to its present high level of efficiency.

Although somewhat similar conditions to those in Russia are seen in some of the British Dominions and Colonial territories, they do not occur here, and for that reason I do not think we shall ever see such a phenomenal development of artificial insemination in Britain.

There is, however, another important aspect which should be kept in mind. Livestock breeding, especially of pedigree stock, is, as mentioned, highly competitive. The man who breeds a "Triple crown winner," for example, or a "Royal" and "Highland" Supreme Champion Bull, will naturally wish to maintain some degree of monopoly of the progeny. He will choose his own best and most suitable breeding females before he accepts those of his neighbours, even at a high service fee. To maintain a limit to the number of offspring is to reap some financial reward for the skill (or luck) of breeding. To multiply the numbers of such offspring tenfold by using artificial insemination is to do more than decimate the value per head.

Further, when natural mating occurs there is fairly good guarantee of the security of the pedigree of the offspring. There would be a great temptation to the more unscrupulous sire owner to substitute sperm from a less valuable for a more valuable sire, with the grave risk of a destruction of confidence in paternity and pedigree of such animals as were born from females inseminated on a large scale.

In this connection, the only mechanism I can suggest whereby this objection might be over-

come is that each insemination should be carried out by a qualified veterinarian, and that as evidence of good faith a strictly worded type of certificate should be issued, signed by both veterinary surgeon and owner, relating specifically to each female (whether mare or cow) which had been inseminated. Otherwise, I can foresee confusion of our valuable pedigree system. Some degree of lack of confidence has already begun in one or two Continental countries, where stud grooms have equipped themselves with artificial insemination apparatus, have learned the technique and are actually carrying it out.

I must make a brief reference to one of the dangers in the mare which has been shown to occur when indiscriminate insemination is carried out. Gonzaga and Ebora (1936) showed that if a pregnant mare is accidentally inseminated she will nearly always abort subsequently. It is, as you are all aware, by no means uncommon for a mare which is already pregnant to come into season and, if allowed, to mate. Natural service is not usually followed by abortion, but the introduction of an inseminator through the cervix is obviously calculated to disturb pregnancy.

I would like to mention one further general consideration. The use of a large number of sires in a breed keeps that breed in a satisfactory state of genetic fluidity. The blood lines are "kept open" as one breeder expressed it. When the blood of any one sire, excellent though he may be, becomes unduly concentrated, two things may happen. First, a greater degree of rigidity in characterisation takes place and the breed becomes less malleable; and second, if there should happen to be some undesirable "taint" in the hereditary constitution of that particular sire, even though it may not be obvious in him himself, there is a greater chance of that "taint" becoming scattered widely through the breed. (I have in, mind such Mendelian recessive characters as hernia, cryptorchidism, overshot-jaw, imperforate anus, microphthalmia, etc., and even possibly shivering and stringhalt.)

So far I have tried to show you one side of the picture, but there is another. What advantages are to be obtained from the use of artificial insemination suitably modified for application to British livestock breeding practice?

The technique has, of course, been in vogue for many, many years as a means of correcting certain forms of sterility or barrenness in individual mares and cows, and is doubtless so well known to you all that it requires no further reference.

In Colonial territories where dourine is common, artificial insemination can be a powerful weapon in preventing the spread of this condition. In this country it could be employed for cattle where vaginitis has broken out, and it might be employed to safeguard a valuable bull from risks of infection with *Brucella abortus*, though I fear that it would do little to protect cows from infection. Several authors have pointed out that by its use, applied to "proven sires," a mechanism for greatly increasing the numbers of offspring of superior dairy cattle would be provided. When an old bull, which has proved his breeding ability in youth, gets too old, stiff, fat or lazy for active service, he could still supply sperm for inseminating females.

The further development of methods of sperm preservation, so that fertilising power is retained for days instead of hours, may be followed by a change in our pedigree export trade. With the development of aerial postage services it may ultimately be possible to retain many valuable sires in this country which otherwise would be sold to go abroad, but to sell their sperm to overseas breeders instead. Just how the big pedigree exporters would view such proposals I cannot say, but it is possible that sales of guaranteed sperm may become as lucrative as the sale of the bull. One hundred doses from, say, ten ejaculations at £10 per dose would return £1,000 in perhaps rather less than a fortnight, and the bull's services would still be retained for use at home.

Some system such as this might contribute to the solution of problems of acclimatisation in tropical countries where, for example, the pure-bred imported sire has a poor chance of survival, but where his half-bred progeny (with local indigenous females) survive satisfactorily the rigours of the climate and are resistant against indigenous diseases.

Conclusion

I have put these facts before you so that you may consider the present position and suggest whatever steps you may deem necessary, either to investigate the subject further or otherwise. I have tried to cover what has now become a very big subject in a somewhat limited time, and, I fear, in a somewhat inadequate manner.

I shall feel adequately repaid if I have succeeded in arousing some interest in a matter of which I fear the profession in this country has not taken a great deal of notice during recent years.

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Discussion

Professor J. F. Craig opened the discussion in the following terms (his remarks being read by Mr. G. O. Davies):—.

I have been invited to contribute to the discussion on Professor Miller's paper on artificial insemination, but I regret to say that it must be made *in absentia,* as unfortunately I have already made another engagement for the day of the meeting.

Through the kindness of Professor Miller I have been able to read a proof copy of the paper and must in the first place pay a tribute to his very clear and comprehensive treatment of a subject which is worth while ventilating in the profession.

Artificial insemination has interested me for a long time and I am fully conversant with the great advances made even within the last decade regarding its technique and the conditions affecting the viability of spermatozoa.

In veterinary practice artificial insemination has been commonly practised in the mare, chiefly with a view to ensuring that the semen after natural service has been properly introduced into the uterus, and sometimes some of the semen has been transferred to one or more other mares that happen to be in oestrus at the same time. This has been done to conserve the energies of the stallion as well as to overcome any of the natural defects of the mare and of the genital passages. In transference to other animals great care was taken that the semen should be kept at blood heat and protected against light.

The essential features of the new technique are that the semen keeps best at a comparatively low temperature under medicinal paraffin to avoid changes in O and CO_2 content of the semen and it is mixed with some glucose and buffer solutions. Under these conditions the fertility of the spermatozoa of certain animals can be maintained for three or four days. The amount of diluted semen required for each animal varies with the species but is much smaller than the ejaculate in a normal service and modern methods have opened up the feasibility of fertilising a number of females from one service and even of sending vials of the semen over long distances for successful insemination. That has been done and the possibilities of the use of this method are very great indeed.

It must be emphasised that the choice of instruments and of method must be varied with conditions and animal and that in any case care must be taken that the spermatozoa will not be adversely affected by metallic objects or agents like disinfectants which may have deleterious effects upon their fertilising properties. It is on that account that glass containers and glass inseminators and ebonite catheters are now used in insemination.

There are certain features of insemination which have to be taken into account in considering its ultimate value:—

(1) The comparatively short duration of viability of spermatozoa, varying from a few hours to a few days according to species. The semen would require to be frequently " on tap."

(2) The procuring of the semen is easy in the dog by slight irritation of the sheath and penis and is readily arranged with the artificial vagina when the animal attempts to serve a female during oestrus. That animal is not always available, but perhaps a dummy might be used in some cases. The absence of a cow in oestrus has often frustrated our attempts at obtaining semen from the bull. The massage of the vesiculae seminales and vasa deferentia has not so far proved successful in our hands but in any case the semen taken under such a condition is apt to be contaminated in the sheath. The artificial vagina must be taken to be the best instrument in the procuring of semen free from extraneous contamination.

(3) The animals to be inseminated must be in oestrus at the time of insemination and when the period of oestrus is long must be inseminated towards the end of that period. The latter point does not apply to the cow or ewe, where the period of oestrus is short. It may be that in the mare the insemination would require to be carried out more than once during oestrus to ensure

fertilisation. Presumably the spermatozoa will not live more than 30 hours in the cervix or uterus.

(4) A great advantage of the newer methods of insemination is that the sample of semen may be sent by post and that the female need not come in contact with the male. This would be very useful in contagious abortion, granular vaginitis, other contagious disease or even worm infestation in the mare where the animal has to be sent to studs which are highly infested.

(5) Even with physical defects in the male or female, fertilisation can be effected in this way.

(6) It would be a wonderful asset where the right type of mating is desired and no contact can be arranged.

(7) The breed societies will no doubt require to be provided with reliable and accurate information regarding the breeding. The method is no doubt open to serious objection that would adversely affect the veracity of the pedigree of the progeny.

One feels that on these considerations artificial insemination will have only a limited application in this country, at least until prejudice can be overcome and desirable sires are difficult to procure.

Before closing, I would like to put on record a small-scale experiment in insemination which I carried out with a fair amount of success some 16 or 17 years ago. The experiment concerned a very valuable nine-year-old pedigree Shorthorn bull, which was bought for 800 guineas. It was a proved sire before purchase. Before it reached the purchaser's farm, it had to remain in quarantine for six months. When it was tried it was found that the bull could not serve a cow owing to the imperfect erection of the penis: the penis could only be protruded from the sheath for two or three inches. After several unsuccessful attempts to correct this trouble it was resolved to try artificial insemination with a number of cows. The method adopted was as follows:—

When a cow or heifer came into oestrus, the bull was allowed to mount the cow and the ejaculate was caught before dismounting in a receptacle like a potato steamer kept warm with a jacket of water kept at a temperature of 102° F. Frequently the first ejaculate was clear and watery and the process was repeated two or three times at short intervals until the yellowish-white, opaque, thick semen, rich in spermatozoa, was ejected.

As soon as possible afterwards the semen, to the amount of several c.c., was injected with an improvised inseminator of the old type into the cervix uteri of the cow. Several very fine progeny were got in this way, but the Breed Society required special confirmation of the insemination and the method before the names of the progeny were admitted to the stud book. This was a case in which the artificial vagina could not be employed.

We are now provided with the equipment necessary for procuring semen in suitable cases and for the moment are considering its use chiefly in cases where the bulls are suspect in outbreaks of sterility in cows.

Mr. G. O. Davies stated that he very much appreciated the visit of Professor Miller, who had given them another contribution of the high standard it was usual to associate with his work. After hearing the paper, he had come to realise that the subject of artificial insemination had many aspects which had not occurred to him before.

Mr. O. V. Gunning stated that he wished to congratulate Professor Miller on the choice of the subject and on the splendid paper he had given, especially the latter part, which he thought was excellent. The subject was one which the profession ought to take more seriously. The stock owner was informed about it, and it was high time that practitioners took more interest and found out exactly to what extent, if any, artificial insemination in all its branches was applicable in Great Britain. He was not quite clear in his own mind on this point, so far as veterinary practice was concerned, although Professor Miller had elucidated many, and he would like Professor Miller's further observations on this question. He (Mr. Gunning) had been able, through the kindness and courtesy of Dr. Walton, to see a good deal of the work in its practical stages. He understood that Dr. Walton had inseminated a Shire mare from a Shetland pony and *vice versa*, and that the Shetland pony mare had given easy birth to a foal, thus proving more or less that the mare regulates the size of the foetus. He would like Professor Miller's confirmation of this. In the nineties, artificial insemination in horses appeared to be practised far more than it was to-day, and it would be interesting to have the views of some of the practitioners of the old school regarding their results. One had informed him that he had met with considerable success in the application of the technique, especially in race-horse stock.

Mr. G. Mayall, after congratulating Professor Miller on his excellent paper, recalled that he was present at a meeting in Great Yarmouth about 35 years ago, when a paper on artificial insemination by Mr. S. Slocock, F.R.C.V.S., was read and discussed. Since then it seemed to him that relatively very little had been done in this country in the direction of artificial insemination. Since the Great War, a tremendous amount of the work had been performed in Russia, and quite recently in Germany the subject had been taken up again. Here it was found a very useful procedure in cases of contagious genital diseases, trichomonal infections and vesicular and nodular vaginitis. It appeared that in these countries, considerable success was being attained. One thought had occurred to him which had not yet been put forward—if tuberculin testing became general there would be a shortage of heifers and cows, and the only way to surmount the difficulty to his mind was the employment of artificial insemination.

Mr. A. J. Wright observed that it appeared that American workers had proved that the percentage of fertility was increased considerably by two inseminations at, he understood from Professor Miller's remarks, 24-hourly intervals. Did that mean that in the case of the cow,

fertility could be increased by two services of the bull at 24-hourly intervals? With regard to the question of the mare and travelling stallions, did Professor Miller think artificial insemination some hours after the normal service would help to increase fertility in mares? If some of the semen were taken at the time of service, what method could be adopted to store the semen? What was the nature of the container and at what temperature ought it to be kept?

Mr. H. T. Matthews stated that he was sure all had listened to Professor Miller with great interest and satisfaction, and they would anxiously wait to read the paper when published, as there was too much to take in all at once. There were two points he would like to raise. He understood Professor Miller to say that in the tropics there was an inherited resistance to disease in cattle. That implied an inheritance of an acquired character. He would like Professor Miller to say whether the inheritance came through the male or the female line; in fact, whether it was a true inheritance or a possible transmission through milk. He also understood Professor Miller to say that by the use of artificial insemination it was possible to avoid the transmission of tuberculosis and abortion from a male showing a definite lesion. Tuberculous metritis in the cow was fairly common and contagious abortion very common, and although neither of these was necessarily transmitted from the bull, there was a possibility. Did Professor Miller mean that an infected male could be safely used by methods of artificial insemination? In conclusion, he hoped that Professor Miller would not think they were uninterested because they could not contribute anything very constructive to the discussion.

The Reply

Replying, Professor Miller stated he would like, in the first place, to thank the previous speakers for the kind things they had said. Professor Craig's remarks more or less reinforced what he himself had said, and he did not think there was much in them that called for reply. The account of his experiment was interesting, and he knew of a similar case in which very closely parallel methods were adopted. With regard to Mr. Gunning's question as to how far artificial insemination was applicable in Great Britain, this might best be carefully considered by practitioners in relation to their local circumstances. They were in a better position to decide. It was difficult to talk generally about the subject, as it was necessary to treat each case on its merits, so he hoped Mr. Gunning would excuse him if he did not deal further with this question. He confirmed Mr. Gunning's statement about the insemination of a Shire mare from a Shetland stallion and *vice versa*. The Shire mare gave birth to a large Shire-like cross-bred and the Shetland pony to a small cross-bred. This indicated that the uterine environment of the foetus played a large part in determining size. With regard to Mr. Gunning's point about race-horse stock, artificial insemination was employed by a number of practitioners in thoroughbred breeding districts to overcome sterility due to various atonic and abnormal conditions of the uterus and vagina. He could not quote precise figures, but since fertility in horses was only about 60 per cent., any particular method that would increase that fertility should logically be adopted. He would like to have had time to discuss more fully Mr. Wright's point about double services by the bull. There was very definite evidence to show that frequently in the case of a bull prepared for show purposes, fattened, etc., the first service resulted in an ejaculate of fluid mainly from the vesiculae seminales and accessory sexual glands, and the second service, 20 minutes to half an hour later, consisted of pure semen only, rich in spermatozoa. With regard to Mr. Wright's question about travelling stallions and the temporary storage of semen, a large sterile glass test-tube filled with fresh ejaculate, sealed over with sterile liquid paraffin and closed by a rubber stopper, could be placed in a thermos flask and packed with ice, and kept at a temperature of 4° C. Sperms could be kept in this way for some hours. If the ejaculate could be centrifuged first, and freed from accessory gland secretions, the semen might survive for one-and-a-half days.

With regard to Mr. Matthews' question about disease resistance, he (Professor Miller) had intended to refer to one specific condition, namely trypanosomiasis. The immunity possessed by the female native cattle had been presumably gradually acquired over a considerable period of time. The question of premunition of the calves born from these native cattle (when crossed by an imported non-resistant bull) did also possibly contribute to the resistance of the cross-breds. Such resistance as might be transmitted genetically could only come from the female parent. He did not think that any factors like immune bodies against trypanosomes were excreted in the milk. In so far as the transmission by coitus of tuberculosis of the genital organs and *Brucella abortus* infection was concerned, he (Professor Miller) had meant to imply that by the use of artificial insemination and collection into an artificial vagina, risks of the bull contracting these infections (*e.g.*, from natural service), and subsequently transmitting them either mechanically or otherwise to other cows he might serve, would be avoided. He had not meant to suggest that if a bull was actually infected, the use of these techniques would enable him to be used safely. He was afraid he had not made the idea clear in the paper or Mr. Matthews would not have misunderstood him.

SHORTAGE OF FARRIERS

Lincolnshire Agricultural Education Committee have promised to consider what steps can be taken to encourage young men to take up farriery.

Interviewed on this matter by the *Farmers' Weekly*, Mr. Tom Tiffin, County Secretary of the N.F.U., said that the Branch had arranged a conference with the Master Farriers' Association to discuss the shortage of apprentices. A date and place were fixed and delegates from the county Branch of the N.F.U. were chosen to attend, but the conference had been indefinitely postponed as the Master Farriers' Association were not able to send a deputation, one of their reasons being that they had difficulty in getting their members to attend, as these were mostly men with one-man businesses.

"The farmers fear that if something is not done soon to make the farriery trade more attractive to youths, the craft will die out," added Mr. Tiffin. "The present farriers are growing older and in Lincolnshire young men are not being trained to follow them. If things go on as they are doing the time will come when the farmer will be unable to get his wagons 'tyred' and his horses shod."

The Lincolnshire Branch have therefore placed their difficulties before the Lindsey Agricultural Education Committee.

CLINICAL COMMUNICATION

Diffuse Papilloma in the Oesophagus of a Cow*

G. O. DAVIES, M.V.Sc. (LIV.), M.R.C.V.S., D.V.H.
DEPARTMENT OF VETERINARY PATHOLOGY,
UNIVERSITY OF LIVERPOOL

This specimen was received from Mr. J. Cane, M.R.C.V.S., to whom I am indebted for the following information:—

Subject.—Three-year-old heifer.

History.—The heifer calved at grass and was apparently quite well after calving. From that time she gradually wasted, but fed quite well and grazed for a time. Three weeks later her condition was such that gruel feeding was tried, to no good purpose. The attendants noticed that cudding was absent and that the heifer coughed frequently.

Post-mortem Examination.—This revealed a large mass of papillomatous tissue involving the lining epithelium of about 2 ft. of the oesophagus, mainly the thoracic portion. The bronchial, oesophageal and some of the mesenteric glands were found to be tuberculous, but there was no evidence, naked eye or microscopic, of tuberculosis in the oesophageal growth. Sections of the growth revealed it to be a typical papilloma.

*Specimen demonstrated at a meeting of the Lancashire Division, N.V.M.A., at Liverpool, November 11th, 1937.

Oesophagus of three-year-old heifer opened to show diffuse papilloma of lining epithelium. × ½.

ARTIFICIAL INSEMINATION

The Ayrshire Cattle Herd Book Society have approved a bye-law providing that "animals got as the result of artificial insemination are accepted for entry in the Herd Book on and after January 1st, 1938, under regulations to be settled from time to time by the Council."

. . . . . .

The British Friesian Cattle Society has been notified of the birth of a calf as the result of artificial insemination. "This calf was born on November 19th last, and," says the *Farmer and Stockbreeder,* "is the first 'international' calf in Europe. Its dam is Terling Torch 67th, owned by Lord Rayleigh's Farms in Essex, and the bull is a well-bred Friesian sire, Odin, owned by Dr. J. Siebenga, veterinary surgeon of Oldeberkoop, Holland.

"The experiment was conducted by the Animal Nutrition Research Institute, Cambridge University, and Dr. Siebenga, with a view to testing methods of international semen transport. The co-operation of Royal Dutch Air Lines and Lord Rayleigh's Farms was readily given.

"Mr. J. Edwards, of the Animal Nutrition Research Institute, writes: 'On the afternoon of February 10th, Dr. Siebenga collected a sample of semen from his bull and stored it in a small test-tube placed among ice in an ordinary thermos flask. This flask, well wrapped in corrugated cardboard, was sent overnight by post to Amsterdam. There it caught the morning 'plane for England and arrived at Croydon in the early afternoon. In the evening it arrived at Chelmsford station and 28 hours after collection Terling Torch 67th was inseminated with it. She carried her calf full-time and produced a fine, healthy heifer calf.'

"Against this 'success' there were seven 'failures.' The samples of semen were not always satisfactory and there is no doubt that packing methods were, in the beginning, partly responsible. Broken flasks mean loss of ice and temperature control. Better results can be expected from improved methods. It is also suspected that the bull, Odin, was not producing the best quality (density) of semen in January and February of 1937.

"In May and June ten very good samples of Friesian semen were sent from Cambridge to Holland—collected from Messrs. H. J. and H. G. Martin's imported bull—Littleport Nico's Lindberg—and with these Dr. Siebenga inseminated 31 cows in his district. The samples were one to three days old on arrival, and it is thought that about half of the number of cows are in-calf."

Professor William Robb, F.R.C.V.S., Glasgow, has been appointed veterinary inspector to act on behalf of the Clydesdale Horse Society at next year's Cawdor Cup competitions at the Dumfries "Highland."

The Veterinary Record

January 8th, 1938.

The Country Practitioner and the Future

In many districts in Great Britain there is already a scarcity of country practitioners and it would appear that if the stock owner is to continue to get the veterinary advice and skill which is necessary in the interests of his industry, steps must soon be taken to arrest the process, which is leading apparently to the gradual extinction of this type of practice.

The country practitioner has no easy life. His area of operation is generally large and for ease of working it is often advisable that one or more assistants should be kept. Without assistance rest is almost impossible for a successful individual.

For many years the rural practitioner has devoted much of his time and skill both towards educating farmers and to improving the stock. He has gradually extended his preventive work and his advice upon the management and feeding of animals necessary to produce the best condition and to retain them in the best of health. This work is the natural outcome of the confidence he has created with the owner as a result of his work in preventive medicine. Should he lose this latter type of work to any considerable degree it is likely the farmer will return to the old habits of calling in his practitioner solely for curative and obstetrical work. Unfortunately, it would appear that within a few years the Ministry of Agriculture is determined to remove most of the preventive work from the practitioner. We foresee as a result of this nothing but a further depletion of the numbers of general practitioners in country districts.

This in itself will result in considerable loss to the agricultural community and also to a lowered efficiency in the State Service itself for, by the extinction of this type of practitioner, the training ground both for students and for young graduates destined for the State Service will be seriously depleted. From information which has reached us it would seem definite that practitioners will not require the assistance of new graduates who would remain with them for periods as short as one year: for the future, practitioners who are still able to employ them may only accept assistants who are willing to enter into an agreement to stay for at least three years.

Even if it were desirable it is doubtful whether the practitioner can as yet turn to any extent towards the diseases of pigs, sheep, poultry and other animals to make good his diminished interest in bovines, although we may confidently look to an extension in this type of work in the future. Unfortunately, in these spheres he comes up against the activity of the unqualified man to a very great extent.

In the interests of veterinary education it would seem to us advisable to incorporate the services of the practitioner, where State schemes of eradication are concerned, permanently within the Centralised Service. Should the intentions of the Ministry prove to be otherwise than this, as appears likely, we ourselves would be totally unprepared to prophesy any reasonable future for well-educated and thoroughly trained veterinarians in agricultural districts.

* * * * *

Artificial Insemination

In veterinary practice artificial insemination has been commonly employed for many years as a supplement to natural coitus in mares and less commonly in other animals. It was intended largely to ensure the introduction of the semen into the uterus and to overcome certain pathological defects or abnormalities. In some cases to conserve the energies of the male and for other reasons the semen was transferred from one animal after mating to two or more females.

In recent years great advances have been made in our knowledge of the conservation of the vitality and fertilising power of the spermatozoa outside the body, of their limited span of life in the female genital organs and in the technique of artificial insemination. The credit for these advances is due in large measure to the work of the late Professor Elie Ivanov and his co-workers. Professor Ivanov was the first to demonstrate that successful impregnation could be effected by the introduction into the vagina of spermatozoa freed from the secretions of the accessory glands, and from that observation there have come into use various diluting fluids, including glucose and phosphates, for the dilution of the semen and the activation of the spermatozoa.

In this way it has been found possible to inseminate an increasing number of females from one ejaculate.

One important result of experiments lies in the observation that the sperm can be got to survive and retain its fertility for a time varying with species if kept at comparatively low temperatures and especially when covered with a layer of liquid paraffin to prevent any disturbance of the gaseous equilibrium of the medium. This opens up great possibilities in the transport of semen over long distances and its use in animals which cannot be brought into physical contact with desirable sires.

As a result of these advances artificial insemination has come into employment on a large scale for the improvement of stock breeding in Russia, Japan, Argentine, Kenya, etc., particularly in areas where good sires are scarce. In this country, where there is no scarcity of desirable sires, it could, with advantage, be extended for use in small herds or flocks where it would not be economic to keep a separate sire, in the prevention of certain contagious affections and in special cases.

In his paper entitled "Observations on the Employment of Artificial Insemination as Applied to British Livestock Breeding," presented at the November meeting of the Lancashire Division and appearing elsewhere in this issue, Professor Miller has given a splendid review of the subject and has indicated very clearly the value and the limitations of artificial insemination in this country.

A great deal of research in connection with artificial insemination has been carried out at the Cambridge School of Agriculture and the improved technique it has evolved is now being employed on a limited scale by stock breeders, and it is probable that the employment of artificial insemination may be extended.

It is, however, essential that in pedigree herds, flocks or studs, the source of the semen used and the breeding of the progeny shall be beyond question and it may be that the veterinary surgeon will serve a useful purpose in this direction.

Professor Miller has performed a great service in bringing the subject to the attention of members of the profession and it should go far to stimulate their interest in the modern methods of artificial insemination with which they should be familiar.

ABSTRACTS

[The Early Diagnosis of Pregnancy in the Mare. (Trans. title.) Hennaux, H. (1937.) *Ann. Méd. vét.* **82.** 353-371. 12 refs.]

A brief summary of the physiology of the sexual cycle is followed by a description of the Aschheim-Zondek, the Brouha-Hinglais-Simonnet, the Friedmann and the Allen-Doisey biological tests for pregnancy. The chemical tests of Manoilov, Costa and Cuboni are also described. The advantages and disadvantages of each test are discussed along with the author's personal observations on each test. The biological methods, for which blood serum is the most suitable, are most reliable between the sixth and eighteenth weeks of pregnancy, while the chemical test of Cuboni, for which urine is used, is 100 per cent. accurate from the sixteenth week up to the termination of pregnancy.

J. S. P.

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[The Grazing of Sheep on Improved Pastures: Its Effect on Superfine Wool. Ross, I. C., Graham, N. P. H., Turner, Helen N., Carter, H. B., and Munz, H. Pamphlet No. 1, Council for Scientific and Industrial Research, Commonwealth of Australia, 1937.]

The authors were led to undertake these experiments through the fear that gradual transition from natural to improved pastures in the higher rainfall areas of Australia may lead eventually to a deterioration in the quality of the wool of the Merino sheep. Many practical sheep farmers, it appears, hold this view and believe that the production of fine and superfine wools on improved pastures is impossible.

A botanical survey of the pastures shows that the most notable difference between what is termed a natural and an improved pasture—brought about by sowing clover seed and top-dressing with superphosphate—is the increased quantity of subterranean clover present in the latter.

The acid test of experimental research, fully described in the above pamphlet, proved the sheep farmers' beliefs to be erroneous and that on the contrary, as one might expect, the results obtained on improved pasture are superior throughout to those yielded on the natural grazing.

Following are the authors' conclusions:—

(1) It is possible for superfine Merino sheep maintained on improved pastures to make much better average weight gains and to grow an average of 2 lb. more wool

per head than similar sheep maintained on natural pasture, the wool production per acre being more than trebled.

(2) There is no evidence that, in superfine Merino sheep of the genetic constitution of those used in these trials, the higher plane of nutrition on improved pastures results in progressive coarsening of the wool fibre, nor in any deterioration of colour, handle, or value of the wool.

(3) Previous indications that the increased risk of parasitism owing to heavier stocking on improved pastures is compensated for by the greater resistance resulting from the higher plane of nutrition were confirmed.

H. A. R.

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[A Treatment of Suppurative Keratitis. Adler, D. A. (1937.) *N. Amer. Vet.* **18.** 3. 41-44. 2 tables.]

Injury to the cornea is invariably accompanied by infection and despite local treatment, in the words of the author, "is always a serious problem." The delicate nature of the cornea prohibits the use of drastic local measures, and it is on this account that the author relies principally on increasing bodily resistance to infection by subcutaneous injections of a polyvalent antigen under the proprietary name "Davenil."

Fifty cases of keratitis have been treated, and of ten tabulated cases there was complete recovery in seven, only partial in two, whilst one resulted in loss of the eye. Two of the ten cases mentioned are reported in detailed tabular form.

(1) A four-year-old Boston terrier with a corneal ulcer of three days' standing received 3 c.c. of antigen morning and afternoon for the first two days, and on the third and fourth days received one injection of 3 c.c. The patient was discharged cured on the fifth day. Local treatment consisted of an "eye wash."

(2) A two-year-old Pekingese with keratitis of unknown origin made a complete recovery in three days without the aid of local treatment, receiving 2 c.c. of antigen each day.

C. F.

* * * * *

[Traumatic Stomatitis — A Drenching Gun Hazard. Pullar, E. M. (1937.) *Aust. Vet. J.* **13.** 4. 150-154. 5 figs.]

This is an investigation into the cause of illness in lambs after drenching with an anthelmintic mixture of copper sulphate and nicotine sulphate, using an automatic "drenching gun." Out of 2,200 lambs drenched, 200 became ill and 60 either died or had to be destroyed. Affected lambs (about eight months old) 24 to 48 hours after drenching were unable to eat and soon lost condition. Examination revealed buccal punctures between the base of the tongue and right jaw, a common sinus with infection and oedema of subjacent tissues. In some cases there were areas of localised necrosis.

The author came to the conclusion that whilst the nozzle of the drenching gun was the direct cause, the human element was a contributory factor in that the operator had only limited experience of the work. From experimental laboratory evidence with rabbits it was concluded that the mixture used was a potent factor in the production of tissue damage.

The author is of the opinion that by alteration in the design of the delivery nozzle future troubles can be avoided [illustrated].

C. F.

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[On the Relation between the Quantitative Changes of Each Serum-Protein and the Increase in Efficacy of Immune Serum throughout the course of Anthrax Hyperimmunisation of Horses. Umezu, M., and Hayashi, R. (1937.) *J. Jap. Soc. Vet. Sci.* **16.** 1. 17-18. (English summary.)]

The percentage changes in the serum albumin, pseudoglobulin 1 and 2 and euglobulin were estimated during the course of hyperimmunisation of horses to anthrax. The minimum effective dose of the serum was estimated at every stage of hyperimmunisation on guinea-pigs. It was found that as the efficacy of the serum increased the albumin-globulin ratio fell. The change in the serum protein ratio was due to an increase of the pseudoglobulin content, which rose by 119 per cent. for 1 and by 27 per cent. for 2. The albumin content fell slightly, while changes in the euglobulin content were variable.

The authors conclude that albumin-globulin ratio of serum appears to be an accurate measure of the efficacy of anti-anthrax serum.

A. T. P.

VETERINARIAN WHO "MADE MOTORING POSSIBLE"

In a New Year message Sir George Beharrell, Chairman of the Dunlop Rubber Co., Ltd., and of Imperial Airways, says:—

"The year now before us is of special interest to me because it marks the fiftieth anniversary of the invention of the pneumatic tyre. John Boyd Dunlop's invention of the cycle tyre in 1888 made motoring possible, and one of the largest industries in the world is the result. We owe to the internal combustion engine the development of flying, with its enormous possibilities for good and for evil. Distances are being eliminated, communications made easier, more frequent and speedier, which are bound to result in a better understanding throughout the world leading, we hope, to peace and prosperity."

As our readers will know, John Boyd Dunlop was a member of the veterinary profession.

Centralisation of Public Veterinary Services

MEETING OF CONSULTATIVE COMMITTEE, N.V.M.A.

A meeting of the Special Consultative Committee was held at 36, Gordon Square, W.C.1, on Thursday, December 23rd, 1937.

The President (Captain Donald Campbell) occupied the Chair, and there were also present: Mr. S. G. Abbott, Captain J. R. Barker, Major J. G. McGregor, Mr. H. T. Matthews, Captain J. R. Rider and Dr. W. R. Wooldridge.

Apologies for absence were received from Mr. H. W. Steele-Bodger and Captain R. Simpson, the last-named also tendering his resignation from the committee in view of his appointment to the new State Service. Captain Simpson's resignation was accepted with regret, and the committee directed that he be thanked for his past services.

The minutes of the meeting of the committee held on December 9th were read and, subject to the relevant paragraph being amended as follows, they were signed as correct:—

> "The committee shared the view, expressed in a letter from the Society of Veterinary Officers, that strong exception should be taken to the action of the Ministry, in that, having promised unconditionally to omit from its letter to local authorities the statement that 'The Ministry therefore can accept no obligation to offer an appointment whether as Superintending Inspector, Divisional Inspector, or Inspector, to any officer of a borough local authority,' it had in fact inserted the following sentence in its place: 'There is therefore no obligation on the part of the Ministry to offer appointments to the whole of the veterinary staff of the borough councils.'"

Commencing Salary and Pensionable Service of Officers Transferred to the Service

The committee considered the report prepared at the request of the committee by an actuary (who was present at the meeting) upon the actuarial aspects of the proposed transference of certain members of the Association from Local Government Service to the Civil Service and certain recommendations were adopted and it was agreed that the letter to the Ministry on these and other points should be drafted in consultation with the actuary.

It was further agreed that upon receipt of the draft letter from the actuary, an interview on the subject should be arranged with N.A.L.G.O., at which the actuary should be present.

The committee acquiesced in the suggestion of Dr. Wooldridge that the Editorial Committee be empowered to consult the actuary, if considered necessary.

Correspondence with the Minister of Agriculture

The committee had before it the letters which had passed between the President and the Minister since the previous meeting of the committee, together with the reply received from the Minister's Private Secretary stating that Mr. Morrison did not feel that any useful purpose could be served by his receiving a further deputation from the Association to discuss the matters raised by the President. It was agreed to accede to the Minister's request that his letter be published in the Association's journal.

An editorial which the Editorial Committee proposed to insert in the issue of the *Record* of December 25th was read. Certain modifications were suggested, which the Chairman of the Editorial Committee accepted, and the editorial as accordingly amended was agreed to.

The committee received letters from certain veterinary officers which it was agreed should receive further consideration at a future meeting in the light of developments in regard to the matters to which they referred.

The meeting was then adjourned until after an Emergency Meeting of Council.

At the adjourned meeting, at which Mr. Steele-Bodger was also present, it was arranged to publish in the *Veterinary Record* the "four point" reply to the Minister drafted at the special meeting of Council, and that this should be followed up with a detailed statement.

In addition, it was the view of the meeting that as much information as possible about the work of the Consultative Committee should appear in the *Veterinary Record*.

The attention of the committee having been drawn to the issue by a county council to holders of licences of a circular letter giving the names of certain of the veterinary surgeons in the county as being approved for work in connection with the Milk (Special Designations) Order, it was decided to make enquiries of the Ministry of Agriculture whether this panel of approved veterinary surgeons had been formed in view of Part IV of the Agriculture Act.

A letter was read from Mr. Steele-Bodger urging that an accredited representative of the Association should reside almost permanently in London, or within easy access, so as to be available for consultations with the Ministry or other bodies, and suggesting, as a temporary measure,

that the President should be urged to accept this duty forthwith, and that the Association bear the cost.

It was agreed to give further consideration to this suggestion at the next meeting.

The date of the next meeting was fixed as Tuesday, January 4th, at 10 a.m., and it was arranged that the first item on the agenda be the question of drawing up a detailed scheme for the employment of practitioners in a part-time capacity. It was agreed that, in the meantime, each member of the committee should be supplied with a list of the fees adopted by the Council in 1925 for the various duties carried out by part-time veterinary inspectors.

. . . . . .

REPLY TO THE MINISTER

The letter to the Minister, to which reference is made in the above report, was dated January 1st, 1938, and was in the following terms:—

Agriculture Act, 1937 (Part IV)

Sir,—The N.V.M.A., at an Emergency Meeting of their Council held on December 23rd, heard with regret of your letter of December 22nd; they, nevertheless, venture to stress the urgent necessity for a further meeting with yourself as it would appear that a difference of opinion may have been created and accordingly that avoidable difficulties may in future occur, either through the Ministry failing fully to apprehend the nature of the objections put forward by the N.V.M.A. or through the latter failing fully to appreciate the reasons formulated by the Ministry. The Council of the N.V.M.A. at the moment hold the very decided view that the necessary conditions antecedent to the successful implementing of the Agriculture Act, 1937, Part IV, have not as yet been obtained and accordingly, and with every respect, in case their views may have been misinterpreted, reaffirm as their considered opinion, that the following points should apply as the basic principles of any policy that is to prove successful and beneficial to the community as a whole, in respect of this particular enactment:—

(1) The permanent inclusion of private practitioners (*i.e.*, Ms.R.C.V.S.) in the Service.

(2) Freedom of choice by the stock owner of the practitioner to be employed.

(3) An invitation to all existing whole-time veterinary surgeons employed by local authorities to accept appointment in the Service. Sec. 19 (3) of the Act would seem to supply the necessary machinery.

(4) The creation of an Arbitration Board for the purpose of dealing with any question that might arise between the Ministry and veterinary surgeons employed.

The Council of the N.V.M.A. appreciate the inconvenience of settling points of detail by correspondence or even by deputations, and it occurs to them that if a representative Advisory Committee could be appointed to settle questions of detail as they arose, it would be possible for the Act to operate as from April 1st next.

The request for a further interview is made solely in the hope of clearing up difficulties that obviously still exist, and which it should not be impossible to solve, and the Council feel that it would be a catastrophe for the community as a whole if the successful operation of the Act should in any way be prejudiced by any lack of understanding upon either side in the preliminary negotiations between those who, after all, are vitally concerned with the working of the Act.

I am, Sir,
Your obedient servant,
DONALD CAMPBELL,
President.

The Rt. Hon. W. S. Morrison, M.C., M.P.,
Minister of Agriculture,
10, Whitehall Place,
S.W.1.

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REPORT OF SPECIAL CONSULTATIVE COMMITTEE, N.V.M.A.

A Correction

In our last issue we reproduced the report of the Special Consultative Committee, N.V.M.A., on the centralisation of public veterinary services, presented to an emergency meeting of Council on December 23rd. In introducing the report, the President drew attention to the following correction to the report as distributed to members of Council which had been adopted by the Consultative Committee that morning, but which we regret was not made in publication:—

"V.R." 50. 1. page 8. col. 2: "Interview sought with Minister":

For: "The committee shared the view, expressed in a letter from the Society of Veterinary Officers, that strong exception should be taken to the failure of the Ministry to omit from its letter to local authorities, as promised, the statement that "The Ministry therefore can accept no obligation to offer an appointment, whether as superintending inspector, divisional inspector or inspector, to any officer of a borough local authority."

Read: The committee shared the view, expressed in a letter from the Society of Veterinary Officers, that strong exception should be taken to the action of the Ministry, in that, having promised unconditionally to omit from its letter to local authorities the statement that

(*Continued at foot of col. 1, page 40.*)

N.V.M.A. DIVISIONAL REPORT

Lancashire Veterinary Association*

MEETING AT LIVERPOOL

A general meeting of the Division was held in the Department of Veterinary Pathology, University of Liverpool, on Wednesday, November 3rd, 1937, at 2.30 p.m.

The President, Mr. H. Sumner, occupied the chair, others present being Miss P. Stubbs, Miss E. H. Patchett, Messrs. C. F. Shawcross, A. J. Wright, E. H. Curbishley, W. Woods, H. G. Hewetson, H. Raynor Hewetson, G. O. Davies, F. Hopkin, G. Mayall, J. W. Wilson, A. L. F. Mullen, G. Tullis, H. Holroyd, G. Shirley, A. B. Mattinson, J. Cubby, R. J. Thomas, P. T. Lindsay, J. O. Powley, H. T. Matthews, R. N. Clunie, W. Kendrick, W. Walker, A. H. Leyland, A. Ratter, E. A. Pearce, A. B. Kerr and J. C. Baird.

Miss V. Tillemont Thomason and Messrs. S. Jones, O. V. Gunning and J. McGhee were present as visitors.

Apologies for absence were received from Messrs. E. J. Burndred, C. T. Trevers, J. T. Allen, J. H. Wright, J. Brennan, J. Holroyd and Sir F. T. G. Hobday.

The minutes of the previous general meeting, having been published in the *Veterinary Record*, were taken as read.

Correspondence.—(1) From the General Secretary, N.V.M.A., regarding a resolution from the Royal Counties Division approving the scale of fees to be paid to veterinary practitioners for tuberculin-testing under the Attested Herd Scheme.

After due consideration, it was resolved on the proposition of Mr. A. B. Mattinson, seconded by Mr. W. Woods, that the Lancashire Division support the resolution of the Royal Counties' Division. (2) From the General Secretary, N.V.M.A., in connection with the resolution from the Division on Air Raid Precautions passed at the General Meeting on May 21st.

*Received for publication November 26th, 1937.

"The Ministry therefore can accept no obligation to offer an appointment whether as superintending inspector, divisional inspector, or inspector, to any officer of a borough local authority," it had, in fact, inserted the following sentence in its place: "There is therefore no obligation on the part of the Ministry to offer appointments to the whole of the veterinary staff of the borough councils."

The President explained that at a Quarterly Meeting of the Council of the N.V.M.A., he had withdrawn the resolution as he felt the case was met by the action the N.V.M.A. had already taken in this direction.

The action of the President was approved.

Deaths of Messrs. Warwick Fowle and T. McGhee.—The President referred with regret to the deaths of Messrs. Warwick Fowle and T. McGhee, and to the loss the Division and the profession had sustained in the passing of two such highly respected and esteemed colleagues.

The members present stood in silence as a mark of respect to the memory of these gentlemen.

Nominations for Membership.—On the proposition of Mr. J. C. Baird, seconded by Mr. W. Kendrick, Mr. J. McGhee, of Tattenhall, was nominated for membership of the Association.

Morbid Specimens.—Mr. G. O. Davies demonstrated a specimen of a small pig affected with variola. He stated that within the last month, three outbreaks had come to their notice, chiefly in Cheshire and Shropshire. The pig had been killed and had the typical appearance of the condition. They had tried transmitting the affection to a rabbit and a cow, but so far had met with no success. The question arose whether the condition was peculiar to the pig or not. Mr. Davies also demonstrated a specimen of a papilloma in the oesophagus of a cow. [An illustrated note on this exhibit appears in the Clinical section of this issue.—Editor].

The President then called on Professor Wm. C. Miller, of the Royal Veterinary College, London, to give his paper on "Observations on the Employment of Artificial Insemination as applied to British Livestock Breeding." [Professor Miller's paper is reproduced, together with a report of the ensuing discussion—opened by Professor J. F. Craig—at the commencement of this issue. The subject is also dealt with in our editorial columns.—*Editor.*]

Vote of Thanks.—Thanking Professor Miller, The President stated they were all very grateful to him for the really excellent paper he had given. He had shown a complete mastery of the subject and had demonstrated his usual powers of lucid explanation. His remarks had been most interesting, and he was sure they would all realise that the meeting had been a great success.

Professor Miller said that he appreciated very much the manner in which he had been received, and had considerably enjoyed meeting the members of the Lancashire Division for the first time. He had never had an opportunity of coming before, and was pleased that this occasion had presented itself.

The meeting was then closed.

J. C. Baird, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Jan. 10th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

Jan. 11th.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, 2.30 p.m.

Jan. 12th.—R.C.V.S. Committee Meetings.

Jan. 13th.—R.C.V.S. Committee Meetings.

Jan. 14th.—**R.C.V.S.** Committee and **Council** Meetings.

Jan. 14th.—Ladies' Guild dance in aid of the Victoria Veterinary Benevolent Fund, at Princes Galleries, Piccadilly, W.

Jan. 19th.—Meeting of the Lancashire Division, N.V.M.A., at Manchester, 2.30 p.m.

Jan. 21st.—Annual Meeting of the Mid-West Division, N.V.M.A., Royal Hotel, Bristol, 2.30 p.m.

Jan. 28th.—Annual Meeting and Dinner of the Royal Counties Division, N.V.M.A., at Reading.

Jan. 28th.—Meeting of the Yorkshire Division, N.V.M.A., at Leeds, 3 p.m.

Feb. 3rd.—R.C.V.S. Council Election: Voting papers issued to overseas members.

Aug. 21st-25th.—Thirteenth International Veterinary Congress, Zürich.

Aug. 26th-27th.—Thirteenth International Veterinary Congress, Interlaken.

Sept. 5th-9th.—Annual Congress, N.V.M.A., at Glasgow.

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PERSONAL

Birth.—Coleman.—On December 26th, 1937, at 50, Friar Street, Reading, to Margaret (née Petts), wife of I. R. R. Coleman, M.R.C.V.S.—a daughter.

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Forthcoming Marriage.—The engagement is announced between Alexander Forbes Ritchie, M.R.C.V.S., Dunard Hotel, University Street, Belfast, younger son of the late John Ritchie and Mrs. Helen Ritchie, Whitecastle, Craigleith Road, Edinburgh, and Catherine Shearer Jones Wight, only daughter of the late Adam Y. Wight and of Mrs. Constance Wight, 7, Hope Street, Edinburgh, 12.

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R.C.V.S. OBITUARY

Frood, John Lamb, I.S.O., 1, The Mall, Surbiton, Surrey. Graduated London, July 10th, 1899. Died December 30th, 1937; aged 63 years.

Hewlett, Kenelm, O.B.E., late Principal, Bombay Veterinary College. Graduated London, July 14th, 1900. Died at Stocklinch, Clevedon, Somerset, December 7th, 1937.

[We hope to publish in our next issue an appreciation of the life and work of the late Mr. Kenelm Hewlett.]

Hallilay, Frank, Southfield House, Wakefield Road, Dewsbury, Yorks. Graduated London, December 10th, 1885. Died December 22nd, 1937; aged 73 years.

The Late Mr. Frank Hallilay, M.R.C.V.S.

A native of Leeds, Mr. Hallilay went to Dewsbury 45 years ago and served for a few years as assistant to the late Mr. Walter Lodge, who at that time had a large practice in Dewsbury and district. Following Mr. Lodge's death about 40 years ago, the old practice passed eventually into Mr. Hallilay's hands. He also married the widow of his late principal, this lady passing away nearly 20 years ago.

His clientele for treatment of the diseases of domestic animals was not confined to Dewsbury, for he travelled at times to various parts of Yorkshire. The oldest surviving officer of the Dewsbury County Borough Council and its predecessor the old Borough Council, he was appointed veterinary surgeon to the Corporation on October 1st, 1893, and he had also to do with the livestock of the municipality so far back as the eighties of the last century. His work on behalf of the Corporation, however, declined when motor transport to no small extent took the place of so many horse-drawn vehicles. Amongst other appointments Mr. Hallilay held was that of veterinary surgeon to the R.S.P.C.A. Hostel at Wakefield.

The deceased gentleman leaves one daughter, Mrs. Eric Fawcett, of Dewsbury, and two step-daughters, Miss E. N. Lodge, and Mrs. A. E. Greenwood, who is resident at Penistone. The late Mr. John F. N. Lodge, auctioneer and valuer of Dewsbury, who died two years ago, was Mr. Hallilay's step-son.

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Still, John Entwistle Lloyd, T.D., Major R.A.V.C. (T.F.) (Retd.), Fairfield, Clevedon, Somerset. Graduated London, May 28th, 1900. Died December 21st, 1937; aged 62 years.

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Welsby, Joseph Randolph, 243, Lower Clapton Road, E.5. Graduated London, June 27th, 1888. Died December 28th, 1937.

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The Late Bailie Balfour Philp, M.R.C.V.S.

In the death of Mr. Balfour Philp, M.R.C.V.S., announced with much regret in our last issue, Cupar mourns the loss of its senior magistrate.

A well-known Cupar and East Fife figure, Bailie Philp, died in the Adamson Hospital, Cupar, on Christmas Day. He had been ill for several months.

Mr. Balfour Philp, who was 54 years of age, qualified as a veterinary surgeon during the early months of the War, and later served for three years in the Royal Army Veterinary Corps. After being demobilised, he farmed Sauchope Farm, Crail, and at the same time carried on his profession as a veterinary surgeon. He went to Cupar in 1926 and established a wide practice and became well known and highly respected throughout East Fife. In 1929 he was elected a member of Cupar Town Council and during the past few years acted as a magistrate.

Deceased is survived by his wife and two sons.

The Interment

The Provost, magistrates and town councillors of Cupar attended the funeral at Cupar Cemetery. There was a large attendance of mourners and the town's flag was flown at half-mast as a mark of respect.

The Rev. R. Alexander, Cupar Old Parish and St. Michael's Churches, conducted the services in the house and at the graveside. The pall-bearers were: Mr. George and Master Key Philp (sons); Mr. Peter Young, St. Andrews (stepfather); Mr. R. Lawrence, Crail, and Bailie A. Bowie, St. Andrew's (brothers-in-law); Mr. Jack Lawrence, Crail (nephew); Provost Russell, Cupar, and Tom Scott, Edinburgh.

Members of the veterinary profession who attended were: Professor Boddie and Professor Mitchell, of the Royal (Dick) Veterinary College, Edinburgh; Major C. E. W. Bryan, Kirkcaldy; Mr. Wm. Anderson, Pittenweem; Mr. Mackie, Kirkliston; Major Andrew Spreull, Dundee; Mr. A. Spreull, Dundee; Major R. G. Anderson, county veterinary inspector; Mr. A. M'Ainsh, Ceres; Mr. J. R. Baillie, Cupar, and Mr. H. W. Wilson, Cupar.

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R.S.P.C.A. LONDON CLINICS

R.C.V.S. President and Colleagues at a Staff Luncheon

A very interesting little function was held at the Comedy Restaurant, Panton Street, Haymarket, W., on Sunday, December 5th, 1937, when the veterinary surgeons and the administrative staffs attached to the 14 clinics administered by the headquarters of the R.S.P.C.A., foregathered for luncheon under the chairmanship of the Chief Secretary of the Society, Captain Fergus MacCunn.

The Guest of the luncheon was Lieut.-Colonel P. J. Simpson, D.S.O., T.D., J.P., F.R.C.V.S., President of the Royal College of Veterinary Surgeons, who is also a member of the R.S.P.C.A. Council, and who, very naturally, has taken and is taking, the keenest interest in the Society's work on behalf of the sick and injured animals of poor people.

Amongst those present were the following members of the veterinary profession: Lieut.-Colonel B. L. Lake, O.B.E., D.S.O., M.R.C.V.S., Major J. Boseley, M.R.C.V.S., Major J. Steevenson, D.S.O., M.R.C.V.S., F. Land, Esq., M.R.C.V.S., Captain S. H. Skelton, M.R.C.V.S., F. Crowhurst, Esq., M.R.C.V.S., Mr. and Mrs. D. H. Sheppard, M.R.C.V.S., J. S. Blair, Esq., M.R.C.V.S., G. A. Tomlin, Esq., M.C., M.R.C.V.S., C. T. Bray, Esq., M.R.C.V.S., W. E. Murts, Esq., M.R.C.V.S., and Miss M. H. L. Jahn, M.R.C.V.S.

Following the luncheon Captain MacCunn gave a short address expressing, in the warmest terms, the gratitude of the Society to the veterinary profession for the generous help they had given in the past, and were giving at the present moment in this beneficent work, and he outlined the extraordinarily rapid growth which attended these activities once the R.S.P.C.A. and the profession had considered the matter together. He concluded his remarks by expressing the very great honour everybody felt was conferred by the presence of so distinguished a guest as Colonel Simpson and extended to him most sincere thanks. Colonel Simpson replied in suitable terms and the gathering was brought to a conclusion by the passing of a hearty vote of thanks, moved by Mr. A. G. Diggon, Assistant Secretary, to the Chairman.

FOOT-AND-MOUTH DISEASE

Further cases of foot-and-mouth disease among cattle were confirmed on Sunday at Stanford, Kent, and Marnhull, Dorset, and on the previous day a case was confirmed at Trowbridge, Wiltshire.

These outbreaks necessitated the extension of the infected areas in Dorset and Wiltshire and in Kent and East Sussex, and Orders were made extending the areas so as to embrace all districts within approximately 15 miles of Marnhull and Trowbridge and within five miles of Stanford. The areas which have been added to the existing infected areas lie in the counties of Gloucestershire, Somerset, Dorset and Kent.

The existence of foot-and-mouth disease was also confirmed on Saturday last among sheep at Kenninghall, Norfolk. The usual order has been issued, and the area subject to restriction on account of the outbreak has been added to the existing Suffolk infected area. The new area lies in Norfolk and East and West Suffolk.

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The Position in France

In a message from Paris dated December 31st, 1937, the Correspondent of *The Times* says: "All French Departments but one, Finistère, are now affected by the epidemic of foot-and-mouth disease introduced from Algeria last March. The number of farms infected has increased from 30 at the end of May to 119,000 at the end of November. The highest figure of 25,000 new farms infected was recorded for the last half of November, since when there has been a slight decrease—the first—to 23,700 in the early part of December. Between 14,000 and 15,000 communes are affected. At the end of November 1,215,000 head of cattle were suffering from, or contaminated by, the disease, and the present figure must be much larger. In addition, about 150,000 sheep and goats and about 325,000 pigs were infected at the end of November. The numbers of these animals in France in March, 1937, were: 15,762,000 cattle, 9,788,000 sheep, 1,358,000 goats, and 7,089,000 pigs, a total of 33,997,000. A statement made in the Chamber of Deputies on December 13th estimated the number of infected animals at 15 per cent. (5,399,550) of this total.

"The mortality among infected or contaminated animals is one-tenth on the average, while the total value of the animals which have died between May and November is estimated at about 30,000,000 f. (£200,000). A grant of 20,000,000 f. is proposed as provisional compensation for farmers who have lost or slaughtered animals, but it is recognised that this figure will need greatly to be increased.

"Regarding remedies, a Bill was passed by the Chamber in June, and amended by the Senate in July, but is not yet law. By its provisions a credit, fixed by the Senate at 2,000,000 f. (£13,500) for 1937, is placed at the disposal of the Minister of Agriculture for the purchase by the State of infected and contaminated animals to be immediately slaughtered. The Senate asks, in addition, that money should be voted for the effective use of vaccination as a preventive, for the reorganisation of the National Veterinary Laboratory, the sanitary control of imported cattle, and the encouragement of insurance and reinsurance against loss of cattle. Strict hygienic measures on the British and Swiss models are recommended; these would include immediate declaration of the first symptoms, isolation of, and prohibition of the sale of, infected or contaminated animals, and strict obedience to

the instructions of the veterinary services. So far there has been no proposal to adopt the British practice of slaughtering all animals on an infected farm."

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In connection with the statement reproduced in our last issue (p. 22) in association with a record of a 27-year-old dog, that in the dog cemetery at Tanybwlch, a gravestone bears the inscription "Coronet, aged 30," *The Times* inserts the correction that this refers to a horse belonging to the late Lord Ystwyth.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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CENTRALISATION OF PUBLIC VETERINARY SERVICES

To the Editor of the Veterinary Record

Sir,—It was with considerable interest that I read your very full report of the work of the Special Consultative Committee of the N.V.M.A. in this week's *Veterinary Record*.

I note that the committee is now engaged in preparing its suggestions for the employment of part-time inspectors in the Ministry's scheme. Let us hope that the suggestions to be made will not be shelved and their place taken by a scheme about which the Ministry has already made up its mind. If the committee feels that it has got the Ministry's confidence in this matter and if it even dare hope for the general practitioners having a place in the sun in this vast new scheme, then let the utmost care and consideration be given to it before any suggestions are made.

Would it be wise for every stock owner to be free to choose his veterinary practitioner for the performance of duties under the Agriculture Act that are to be carried out by the part-time staff? The President of the N.V.M.A., who is working so actively just now for the profession, states in his New Year's message—"May I interpolate a hope for the speedy disappearance from our current speech of a phrase to which I have always taken exception—I mean the reference to our professional colleagues as 'opposition.'" May I suggest that the introduction of an element of competition into your part-time scheme, sir, is not a very good way to bring this about. I believe that if the committee's suggestions are based on this principle there will be brought about a soaking up of all part-time appointments left in a not very distant future. In my view, if any part-time scheme is to be successful, all individual members of that scheme must be united solidly in one organisation, doing their jobs thoroughly, working as brothers and without jealousy or grievance. Any grumbles or complaints in the future will not only be detrimental to the quality of the work being done for the Ministry but will, I believe, be the Ministry's starting point for the elimination, for all time, of the part-time staff.

I suggest there is only one solution and that is the adoption of equally divided areas, county by county and as near as possible according to the distribution of stock. Such a scheme would have many advantages:—

(1) It would remove the element of competition amongst the members of the staff.

(2) It would remove all suspicion of leniency in applying the Act in an endeavour to obtain an increased part-time area. The eventual effects of this failing of human nature in some individuals, on the Ministry, are obvious.

(3) It would offer encouragement for young graduates to go into private practice knowing that they will have a certain income guaranteed and as much standing with the agricultural community as their colleagues in the same district.

(4) It would encourage a more systematic application of any inspection, etc., made necessary by the Act. If it is to be left to the stock owner to call in a part-time officer—and knowing the usual mentality of stock owners as far as Acts are concerned, confusion is bound to arise—small-holdings and small farms will probably be missed by any inspection, and canvassing by the part-time official will occur and probably be necessary.

Coupled with such a scheme could not the following recommendations be made:—

(1) A reshuffle of areas every seven years or so to enable young graduates to be offered a part-time appointment and to enable adjustments to be made where older men have retired.

(2) Distribution of areas according to the number of practices and not the number of assistants employed therein: where assistants are employed the part-time work to be performed only by the Principal.

If a part-time system ever does evolve from this new scheme let us show the Ministry how capable we are of doing our job and let us as one body guard our appointments jealously. Let the R.C.V.S. deal severely with anyone in whom the Ministry have put their trust and who does not do his work efficiently.

Now that such an important crisis in the general practitioner's life history has apparently been reached, let us hope that any heads of the profession working for this part-time cause will forget that they have or perhaps used to have very extensive areas of part-time work at home and let us hope that they will remember they are working for a community whose backbone consists of perhaps less successful individuals than themselves, too tied to their practices and not independent enough to attend meetings away from home, but who only want an equal share in any part-time system which may eventually be evolved. At the same time, let us offer our hearty congratulations and appreciation for the tremendous amount of excellent work which they have been doing on our behalf.

H. C. Swann.

White House,
London Road,
Kings Lynn,
Norfolk.
January 3rd, 1938.

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RESEARCH

To the Editor of the Veterinary Record

Sir,—I am prompted to write this letter because reorganisation is now "in the air." County council and borough officials of the veterinary profession are to be welded together to form a State Service. It seems that now might be an admirable time for considering the position of the research worker. My remarks are largely concerned with bacteriology and its application to disease problems; this is natural and right, not only because I am a bacteriologist myself,

but also because the vast proportion of our research workers are bacteriologists.

My criticism of bacteriological research is that its advances are altogether too slow. This is, moreover, not only a criticism but a statement of fact. What real advances have been made in recent years? If we ask this question—and few of us wish to be stirred out of our mental complacency by being presented with it—we must either admit that they have been alarmingly few or search feverishly in our minds for some of the aetiological and diagnostic advances which were made, in general, about 50 years ago. If we are honest we must admit that Jenner and Pasteur made the first, last and only fundamental attack of any importance on disease when they introduced vaccination; and even that was only prevention.

Since then our methods have hardly changed. We still attempt vaccination and we still hold to the Jenner-Pasteurian principle of vaccinating with organisms attenuated in some way. We have improved our technique, and periodically we discover a new antigen whose presence is of vital concern to the immunity process. At each step we convince ourselves that now we really have got to the root of things. But, under suitable conditions, disease goes on in spite of vaccination; sometimes even because of it. It is a moot point whether a disease ever could be wiped out by vaccination alone; field observations and experimental epidemiological studies suggest that it is impossible.

It is true that we have eliminated several diseases from the country, glanders, cattle plague and rabies, to mention but three, and have others such as foot-and-mouth under control. But this is due to advances in hygiene. It is equally true that the advances in hygiene are largely based on bacteriological methods of diagnosis, but our methods of controlling disease are frightfully crude and could almost equally well have been carried out (and probably were) by the Ancient Britons in the Stone Age. In brief, our methods have consisted of slaughtering all sick animals and all those which might become sick at some future date. What a state of affairs! And what a state of mental degeneration (or should one say lack of development?) to reach when we have to admit that we cannot combat germs except by starving them!

Now what are the causes of this slow advance? In my opinion they are several and complicated.

First and foremost, bacteriology is a science without any foundation of academic knowledge. It is unique in this respect, since every other applied science has been preceded by a state of academic adolescence and often of maturity. In short, we know next to nothing of bacteria *per se*. With few exceptions we have no idea how bacteria cause disease, only that they do. Yet we have the temerity to disregard this and go ahead trying to introduce methods of cure and prevention. Personally it surprises me that we have got anywhere at all, let alone that we are only moving slowly.

A second cause is that we either pay our research workers too little or too much. In discussions with various people on this point it has been repeatedly said to me, "If you want the best men you must pay them." Indeed, we have seen of recent years many promising men leave research for more lucrative fields; I know several of these men and have a tolerably high opinion of their abilities. I am in complete accord with the belief that men needed for present day research are available and only need to be attracted by better financial prospects.

On the other hand, the salaries of research workers are sufficiently high to encourage a proportion of parasites and wasters. It must be remembered that work of this type has certain advantages over, say, general practice; for instance, one is not at the beck and call of the general public at all hours of the day and night. Moreover, the fact that scientific work is often long drawn out means that a worker cannot, and indeed should not, be under constant supervision; hence a proportion of researchers find opportunity to take a rest cure. Now clearly if salaries were lower, only keen men would be attracted to research and it is almost axiomatic to say that keen men are good men. But this type of man in general has a scientific leaning and, therefore, wishes to study the academic side. Under present conditions he is unable to do this and so an *impasse* is reached.

Destructive criticism is easy and often valueless. I must, therefore, in self-defence if for no other reason, suggest a solution to this problem.

My solution would be to let present-day methods of research continue—clearly this could not be stopped in any case—but in addition I would collect together a body of workers and let them work on purely academic problems for ten or 20 years. These men would be financially and scientifically of equal status and they would direct their own work; it might perhaps be necessary to have a nominal administrative head, but he would not interfere in any way. Such men would have to be fully alive to their responsibilities. All research workers with any introspective imagination will agree that moods of deep depression seize them when they think of what they have done and what there is to do. The academic worker would get such moods frequently, especially if discoveries of apparent practical importance were being made without his assistance. I would wager that, in the long run, progress would be quicker if we had a basis of academic knowledge. After a while we should be able to make a mass attack on disease in general instead of frittering away our time trying this vaccine and that. We should be able to cure as well as prevent and our preventive measures would be delicate and not crude.

This is not altogether a Utopian hope. We have men in the profession who are anxious to do this type of work and others could be trained. Among the younger members of the profession we have, for instance, at least five trained bacteriologists; we also have men conversant with pathology, biochemistry, parasitology and statistics. These would form a useful nucleus, and others could be added as they were found.

Yours faithfully,

F. W. Priestley.

Coldharbour,
Wye,
Ashford, Kent.
December 23rd, 1937.

ADVERTISER'S ANNOUNCEMENT.

B.D.H. Vaccines and Sera.

The British Drug Houses, Ltd., Graham Street, City Road, N.1., have issued a booklet from which it is to be noted that the B.D.H. laboratories for the preparation of vaccines and sera are now complete, illustrations of the various departments being reproduced in the introductory section of the booklet. The booklet contains also the names of the full range of B.D.H. Vaccines and Sera, together with notes on indications, administration and dosage, packings and prices; there is also a useful bibliography for any who wish to study the subject more exhaustively.

Medical products bearing the B.D.H. guarantee inspire confidence throughout the civilised world and it is felt that amongst the numerous readers of this journal there are many who would welcome vaccines and sera bearing a similar guarantee. The firm will be pleased to send a B.D.H. Vaccines and Sera booklet to anyone who cares to apply.